KIRWIN NATIONAL WILDLIFE REFUGE

Kirwin, Kansas 67644

ANNUAL NARRATIVE REPORT

Calendar Year 1991

Bruce Schoonover 3/2/94
Refuge Manager Date

K Nagel 3/21/94
Refuge Supervisor Review Date

Regional Office Approval 3/27/94
Date

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INTRODUCTION

The Kirwin National Wildlife Refuge, authorized under a General Plan approved by the Secretary of the Interior on June 17, 1954, was established to provide habitat for and facilitate the management of the Nation's migratory bird resource. Basic authority for the existence of the refuge stems from the Migratory Bird Treaty Act, the Migratory Bird Conservation Act, and the Fish and Wildlife Coordination Act. The refuge is an overlay project on the Bureau of Reclamation's Kirwin Reservoir, fed by the North Fork of the Solomon River and Bow Creek. Fee title to the land is held for the United States by the Bureau of Reclamation. Control of the reservoir rests with the Kirwin Irrigation District and the Bureau of Reclamation. The watershed of these two sources extends into western Kansas and covers approximately 800,000 acres. The 10,778 acre refuge is located 4 miles west of Kirwin, Kansas, in Phillips County in North central Kansas.

The primary purpose of the reservoir is to provide flood control and irrigation water for the Kirwin Irrigation District. The Kirwin Irrigation District irrigates over 7,000 acres of cropland below the reservoir. In recent years, the combined effects of reduced stream flow and irrigation release has resulted in a steadily decreasing lake level. Lake bottomland exposed by the receding water has developed into brushland and riparian timber. The increase in brush has led to a decrease in waterfowl use. In an effort to reverse this decline, the refuge is using cooperative farming to maintain areas cleared from brushland. At present, the refuge has nearly 2,625 acres in timber and brushland, 2,350 acres of water and mudflats, 2,615 acres of cropland (alfalfa, cane/milo, corn, wheat), 40 acres of wildlife food plots and nearly 3,148 acres of grassland.

The primary management purpose of the refuge is to provide food and resting habitat for spring flights of migratory waterfowl. Secondary objectives are: (1) to feed and protect fall flights of migrant waterfowl; (2) to provide food and protection for wintering ducks and geese; (3) to protect and maintain indigenous species of upland game birds, small game, and big game; (4) to provide public hunting of migratory and resident game species; (5) to cooperate with the Kansas Wildlife and Parks in furnishing a warm water fishery; and (6) to provide the public an opportunity to enjoy, through observation, the aesthetic values of the wildlife resource.

The topography of the refuge is rolling with grass covered hilltops nearly 200 feet higher than the wooded creek bottoms. The lake covers about 5,000 acres at conservation pool level. Land above the conservation pool is cropland and grassland with shelterbelts of cedar and deciduous trees. The lake has been below the conservation pool elevation of 1,728 feet since 1971.

Changes in the watershed have largely caused the decline in water levels. Conservation tillage, terraces, an oil refinery, and numerous farm ponds have considerably reduced stream flow. An increase in agricultural use of groundwater for irrigation purposes in the western portions of the watershed have lowered the water table, further reducing stream flow.

A. HIGHLIGHTS

A. Assistant Secretary Hayden visits refuge. (Section J.3)

B. Kirwin Reservoir water levels remain close to dead pool elevation. (Section F.2)

B. CLIMATIC CONDITIONS

The old saying "If you don't like the weather in Kansas, just wait one day, it will change," was certainly true in 1991. The Refuge was hit by a tornado on April 11th (no damage), and a 14" snow beginning on the 30th of October and continuing the following day. 1991 was once again a drought year in this part of Kansas as total precipitation was only 18.10". Normal for the year is 23.00". Subsoil moisture was extremely critical. Winds at the beginning of the year caused considerable soil erosion, however, snow and rain received in November and December had begun to rebuild the depleted subsoil moisture.

The coldest days registered were January 1st and 2nd at -15F and the hottest day of the year was July 8th when the thermometer read 110F.

The following table provides a month by month summary of weather conditions during the year.

Table 1 - Weather Conditions - 1991

	TEMPERATURE		PRECIPITATION	
	High/Date	Low/Date	Amount	Above/Below Normal
January	51/14	-15/01	0.19	-0.16
February	70/22	07/01	Trace	-0.61
March	82/27	12/01	1.52	+0.01
April	86/08	25/01	2.44	+0.43
May	93/29	30/06	3.47	-0.48
June	104/26	49/17	.95	-2.72
July	110/08	56/26	1.13	-1.58
August	107/02	53/12	3.80	+0.96
September	94/13	32/19	.67	-1.95
October	95/18	17/31	.53	-1.05
November	64/14	20/08	1.60	+0.83
December	59/09	13/19	1.80	+1.42
TOTAL			18.10	-4.90

Kirwin Reservoir elevation was at idle storage level and no irrigation was conducted during 1991.

C. LAND ACQUISITON

1. Fee Title

In 1987, the Bureau of Reclamation expressed the desire to transfer a small acreage below the dam to Fish and Wildlife Service. Although the land concerned would be managed as if owned by Fish and Wildlife, the Bureau of Reclamation would maintain the operation of the dam structures. However, this transfer has not been completed due to delays within the Bureau of Reclamation system.

D. PLANNING

1. Master Plan

Kirwin National Wildlife Refuge functions without a Master Plan. The refuge is an overlay on a Bureau of Reclamation irrigation/flood control reservoir.

2. Management Plan

A Public Use Plan had been submitted to RO for approval in 1990. This plan involved the next 10 years of operations, and provided for current, as well as anticipated use if the reservoir should fill to conservation pool. No action was taken on this plan, and towards the end of 1991 it was returned to this office for modification and updating by the "new" management in place. This will be done in FY 92.

5. Research and Investigations

Quality base line water quality samples continued to be taken in 1991. Tests conducted encompass temperature, dissolved solids, clarity, pH, and alkalinity.

E. ADMINISTRATION

1. Personnel

Doris Hagman, Richard Erdahl, Sam Milazzo, & Stephen Knowles, received $250 Special Achievement Awards for insuring that the Refuge operated efficiently during the period that Kirwin NWR was without a Project Leader.

Maintenance Worker Richard Erdahl received his 30-year pin on February 15.

Doris Hagman, Refuge Assistant, received her 30-year pin on 03/12/91. She retired after 30 years of exemplary service on 06/29/91. A retirement party was held on 07/13. Ray Rauch (RO), Maury Wright (RO), Bob Shields and Milt Suthers (previous refuge managers) were among those present.

Fig. 1 - Zone Supervisor Ray Rauch presents Doris Hagman with a plaque of appreciation for her 30 years of outstanding performance for the FWS. 7/91 BTS

The new clerk, Diane Stockman, entered on duty 04/22/91.

Project Leader Milt Suthers transferred to the Regional Office on 03/09/91.

Project Leader, Bruce T. Schoonover, GS-11 entered on duty 07/01/91.

Refuge Operations Specialist Chad Karges accepted a position at the Jordan Station of CMR Refuge and transferred 07/29/91.

Temporary summer laborer Stephen Knowles entered on duty 03/11/91.

Student Conservation Association Volunteer, Chris King, performed a wide scope of refuge tasks. His assistance in biological monitoring and the grazing program was a definite asset during the absence of a Project Leader. He also presented bi-weekly programs to various scout groups at Camp Hansen, which is located adjacent to the Refuge.

1 2 3 4 5 6 7

PERSONNEL

1. Bruce T. Schoonover, Refuge Manager, GS 11/5, PFT, EOD 07/01/91.
2. Chad Karges, ROS, GS 9/2, PFT, EOD 07/30/89, transferred to CMR on 07/29/91.
3. Diane Stockman, Refuge Assistant, GS 5/1, PFT, EOD 04/22/91.
4. Richard S. Erdahl, Maintenance Worker, WG 8/5, PFT, EOD 03/21/83.
5. Samuel L. Milazzo, Maintenance Worker, WG 8/5, PFT, EOD 05/11/87.
6. Stephen J. Knowles, Temporary laborer, WG 2/2, TPT, EOD 03/11/91.
7. Chris King, SCA volunteer.

The following is a table of staffing patterns for the last five years.

Table 2 - Staffing patterns (5 year summary)

	Permanent			Total
	Full-time	Part-time	Temporary	FTE
FY 1991	5	0	1	5.25
FY 1990	5	0	3	6.1
FY 1989	5	0	3	6.1
FY 1988	5	0	2	5.6
FY 1987	5	0	2	5.6

3. Other Manpower Programs

A work crew from Stockton Correctional Facility continued working at Kirwin NWR during 1991. Crews are composed of 6-7 inmates and one guard. Inmates are minimum security prisoners helping the local community through work projects while serving their time. Crews, with refuge staff supervision, worked on projects such as planting windbreaks, low-water crossings, mechanical removal of musk thistle, and fence construction/repair. They also accomplished many other labor intensive tasks that the limited refuge staff could not have accomplished without neglecting other refuge operations. The crews are also instrumental in the stations chemical reduction program through their hand removal of noxious weeds. We continue to be grateful for the additional manpower.

5. Funding

The following table outlines funding and its source over the last five years of operation at Kirwin.

Table 3 - Funding (5 year summary)

Fiscal Year	Base 1260	Base 1261	Base 1262	**1120-6B	Quarters 1994/8610	TOTAL
1991	0	155,000	*123,000	0	7,100	283,417
1990	0	150,000	82,592	1,500	5,885	239,977
1989	0	145,000	85,000	0	4,915	234,915
1988	0	145,000	108,900a/	0	3,762	257,662
1987	232,000b/	0	0	0	2,924	234,924

* $43,000 MMS Projects
** Wetland Restoration on Private Land
a/ $57,300 Small ARMM plus $8,000 Resource Problems Fund
b/ $20,000 Small ARMM

6. Safety

The following films were shown at the monthly safety meetings.

January	By Nature's Rules
February	Underground Tank Removal
March	Partners in Safety
April	New Breath of Life
May	It Always Happens to the Other Guy
June	Hot Cords Can Burn
July	Safe Use of Crop Harvesting Machinery
August	Listen Up with Norm Crosby
September	Safety Check your Car
October	The Color of Danger
November	Safe Operation of Farm Tractors
December	The Anatomy of an Accident

No lost-time accidents occurred on the refuge during the calendar year.

A reverse-osmosis system was installed at the Residence Quarters due to a dangerously high nitrate content in the drinking water.

Safety belts for use while working on windmill towers were purchased.

7. Technical Assistance

Manager Suthers presented the "Integrated Pest Management" section for the Phillips County Alfalfa Production school. Also discussed with those in attendance was the possibility of a crop scouting service for detrimental and beneficial insect populations.

A grasslands tour to discuss the Refuge HRM grazing program was held in July with approximately 50 individuals ranging from local farmers to SCS and State wildlife personnel in attendance. The tour was conducted this year by the Phillips County Extension agent.

8. Other

Interest continues to grow in wood cutting on the refuge. Only wood that is planned to be removed for management objectives is allowed to be taken. Permits are issued for two week periods, and do not coincide with hunting seasons to prevent potential permittee/hunter conflicts.

A Nebraska bee keeper again renewed his permit for 112 hives on three refuge sites.

Two special use permits were issued to photographers from Wichita, Kansas.

$28.00 was received from the Boy Scouts of America for SUP-220 annual lease on 28A of refuge land.

A payment of $1,500.00 was received for renewal of a special use permit issued to the Kirwin Trailer Lake Village.

F. HABITAT MAINTENANCE

2. Wetlands

The Bureau of Reclamation and Kirwin Irrigation District control the reservoir water levels. Draw downs usually occur from mid-June to mid-August to irrigate croplands downstream. Surface acres of the reservoir pool have varied from 800 to 2500 acres in recent years. The variation is a result of irrigation withdrawals and precipitation amounts.

The year began with the reservoir water level at elevation 1695.95, which is 1.05 feet below inactive level and 2.95 feet above dead pool elevation. Surface acreage was only 915 acres. While the lake elevation did rise above the inactive level, it was not enough to warrant irrigation. Evaporation then reduced the lake to a level similar to the beginning of the year.

Graph 1 - Annual water levels - Kirwin Reservoir

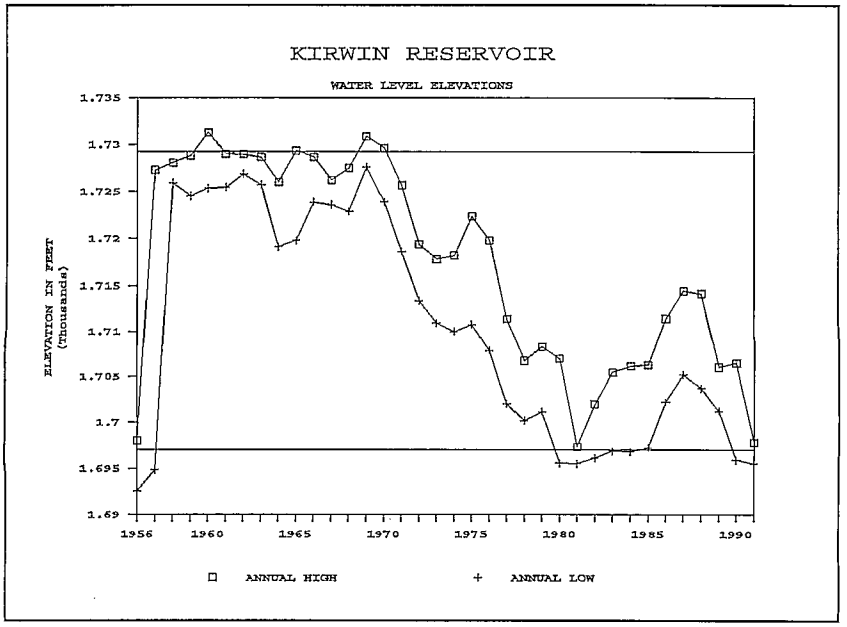

Fig. 3 - Kirwin Reservoir remained close to dead pool much of the year, dropping to a low of 879 surface acres in October, which is far below the 5,029 surface acres at conservation pool.
10/91 BTS

3. Forests

The forested areas on Kirwin consist of riparian areas and shelterbelts. Riparian timber/brush areas comprise approximately 2,600 acres. This habitat is primarily located along the old lake shore, along Bow Creek and along the Solomon River. It provides excellent habitat for white-tailed deer and turkeys, along with other resident wildlife species.

Fig. 4 - Volunteer cottonwood, willow, and salt cedar in the dry lake bed and along Bow Creek provides tremendous resident wildlife habitat. 10/91 BTS

Shelterbelts make up 41 acres and also provide excellent resident species habitat. Most shelterbelts are made up of eastern red cedar, osage orange, and Chinese elm trees planted prior to acquisition of the refuge.

Two thousand red cedar were planted by the Stockton inmate crew. The trees were used to plant three miles of new windbreaks and as part of a nursery establishment. A mechanical Weed Badger was ordered for tilling around the new tree plantings.

The nature trail shelterbelt was cleaned of fallen trees and branches by the inmates and several small openings were created by Solida & Sons Tree Service. The openings will be planted to fruit bearing bushes to increase wildlife diversity.

4. Croplands

1991 was the fifth year into a sustainable farming approach, which involves a six year crop rotation plan. It was also the fourth year in a row of drought conditions in Kansas, with a total precipitation of 18.1", falling 4.9" short of the normal 23.00 average. Rains in March, April and May provided just enough moisture to give crops a good start, even though May precipitation was .5" below normal. During the critical growing period of May, June and July, overall moisture received was 4.8" below normal. This precipitation, along with a lack of subsoil moisture, kept farmers on their knees daily looking to the heavens. It apparently worked, because small rains seemed to come at critical times and most of the crops produced fair to good yields. Much of the winter wheat did not survive the winter, and was replanted to a spring crop of barley. The winter wheat that did produce a crop did well, averaging close to 35 bushel per acre on the refuge. Milo yields ranged from 12 to 65 bushel per acre, and averaged close to 50.

Fig. 5 - Alfalfa production in 1991 was slightly better that the previous year, with yields up to 7 ton per acre, compared with 5 to 6 tons in 1990. 8/91 BTS

The six year crop rotation generally includes winter wheat interseeded with sweet clover the first year, harvested winter wheat, 2nd year sweet clover, milo, corn, and one field of alfalfa rotated every 3-6 years. Shares are figured on a 1/4-3/4 basis, with the government getting 1/4 for wildlife. This share differs from the customary 1/3-2/3 shares in the area, because the cooperators are being required to follow our

cropping plan, are sharply restricted on chemical usage, and wildlife benefits significantly from the browse provided by winter wheat and alfalfa, which is normally considered the cooperators share.

Fig. 6 - All refuge farming is done by cooperators, with the governments share left in the field for wildlife. 11/91 BTS

Sweet clover is planted into winter wheat to build the soil, control weeds, and provide wildlife cover. In 1991, sweet clover production varied greatly throughout the refuge. Soil types and methods of planting are two variables contributing to the difference. Second year sweet clover is generally considered part of the governments share. When conditions are right, we find from 90-95% weed control with the clover, and excellent wildlife cover. The problem is that when the clover stand is thin, weed control is poor, and a whole crop of weed seeds is produced. If the weeds are controlled by mowing, wildlife benefits are sharply reduced. If they go to seed, the farmers must contend with the increased weeds the next year, at the same time we are asking them to farm without chemical. SCS has said soil types vary significantly on the refuge, and sweet clover will probably not be a dependable crop on refuge fields. For this reason, other legumes will continue to be tried in a effort to provide the benefits of sweet clover, but with greater dependability.

Along with improved crop rotation, our farming program incorporates many biological pest controls. While only semaspore bait for grasshoppers was used in 1991, the following table lists biological controls already established on the refuge.

Table 4 - Biological Pest Control - Kirwin NWR

PEST/TARGET AREA	BIO CONTROL	COMMON NAME	RELEASE YR.
Alfalfa Weevil - Larvae	Bathyplectes anurus	Parasitic Wasps	1987
Russian Wheat Aphid	Coccinella septerpunctata	Lady Beetle	1987
Russian Wheat Aphid	Hippodamico variegata	Lady Beetle	1987
Musk Thistle - Seed Heads/Stems	Rhinocyllus conicus	Weevil	1988
Alfalfa Weevil - Adult	Microctonus aethiopoides	Parasitic Wasp	1988
Alfalfa Weevil - Larvae	Bathyplectes anurus	Parasitic Wasp	1988

5. Grasslands

There are currently 3,148 acres of grassland on Kirwin. Prior to the implementation of the grazing program in 1987, most grasslands were suffering from overrest, as evidenced by areas of bare ground, noxious weed invasion, and poor plant health. Despite dry conditions, the grasslands are beginning to show signs of improvement in many areas.

The four year drought for north-central Kansas continued into 1991. Grasslands were slow to respond to grazing and haying treatments and no prescribed burns were conducted because of the low moisture levels.

One retired farm field and one small corner plot were reseeded to native grasses in 1991. In addition, several small plots of monotypic smooth brome were broken up by neighboring farmers. These areas will be farmed for 2 or 3 years, before being reseeded to natives.

The refuge was the site of a grassland tour on July 9, sponsored by the local County Extension Agent to explain the benefits of time controlled grazing. The tour was attended by over 50

people, most of whom were private landowners interested in improving their own programs. The refuge program was well received, and generated a lot questions and interest.

6. Other Habitat

Several areas of recently dried lake bed were mowed to slow or prevent invasion by willow, cottonwood and tamarisk. Many areas require repeated mowing to stop the trees. These areas are generally too wet to grow grass, however, the trees are controlled to keep areas clear for when the water returns and to create habitat diversity.

Due to the low water levels, large mudflats were present that provided ideal conditions for shorebirds. Many of these areas grew up to stinkgrass and smartweed and should be ideal feeding grounds when flooded.

7. Grazing

Previous to 1988, grassland management on Kirwin NWR had been rest, occasional fire, and haying. This type of management led to a deteriorating grassland community evidenced by increasing weedy patches, invasion of brome into native grasses, and many areas of dying and dead plants, along with increased bare ground and soil capping. Grazing was begun in 1988 as a tool to reverse this decline and in 1991, 2437 acres of refuge and 423 acres of adjoining private grasslands were grazed using biological planning and time control grazing. The base grazing fee was $10.30/AUM. Deductions were made for labor and materials provided by the permittee.

Drought conditions continued for the fourth year in 1991. With inadequate rainfalls, and a total lack of subsoil moisture, grass response was only fair following the planned grazing, and many adjustments had to be made as the program proceeded. Problems involving water and fence were also enhanced by the dry conditions.

G-3, 4 & 5

These units were grazed as a cell by one permittee. Problems were encountered almost daily, beginning with the cattle turn-in on May 1, seven days later than planned. The water source for much of G-4 & 5 was a private well just off the refuge boundary. In exchange for the water, we agreed to maintain the system, which was old and worn. We replaced the water pump, repaired the windmill head twice, and many times had inadequate water because the well didn't have the capacity to supply water to both herds. Also, the permittee used his own battery powered fence charger, and had continuous problems with his cattle being out. Finally, on July 10, he pulled out earlier than

planned without grazing seven paddocks a second time. Cattle moves began on 2 day intervals, and by mid-May varied between 3 and 7 days.

Plant response was quite poor following the grazing. This was only the second year of grazing on Units 4 & 5, and much bare soil and brome invasion remains. In 1992, more herd impact will be needed in Unit 5 to reduce a heavy mulch accumulation. An existing water source will be piped to Units 4 & 5 to relieve the water shortage, and a 30 acre field of pure brome grass in Unit 3 will be farmed for several years to prepare a seedbed for native grass.

Fig. 7 - (Unit 4, photo pt. 17) Future grazing will be used to target this heavy smooth bromegrass invasion. 5/91 CK

G-7, 8, 9, 10a

These units consisting of 140, 157, 160, and 185 acres respectively, were grazed by one permittee as a cell. These units were not grazed in 1990. In 1991, grazing began on May 13 in G-10a, then to 9, split herd to 8 and 10a, and ending in 7 and 9 on July 31. Cattle moved through the 16 paddocks on 1-6 day moves. These units have a large variety of grassland conditions, including areas of annual weeds, cheat grass mats, and reseeded native grasses suffering heavy mulch and brome invasion. Grazing impacts included a reduction in the excessive mulch accumulations, a trampling of the annual weeds and cheat grass areas, and the disturbance of capped soils. Plant response after the grazing period was only fair, due primarily to a lack of post graze rainfall, although annual weed

production and some new seedlings were found in the areas of bare soil.

G-11 & 14

This is the fifth year that Unit G-11 has been grazed. In 1991, this 440 acres Unit was divided into 19 paddocks. Grazing began on April 25 with 50 cow/calf pairs. Cattle were moved on 3 day intervals, and on May 14, the herd size was increased to 110 pairs. After grazing each paddock for 3 days, cattle were pulled out on June 12, and moved to Unit 14, which consists of 320 acres and 16 paddocks. Moves continued every 3 days, and on July 16, the cattle were returned to Unit 11 for a second time through. Moves were shortened to 1-2 days, but the cattle were removed on August 3 before all planned grazing was completed. Plants had responded only fair after the first grazing period due to the extreme drought, and grass conditions did not warrant further treatment. As documented by photo points in the Units, bare ground in many areas has begun to disappear. Also, it has become evident that areas dominated by Musk Thistle in Unit 11 are beginning to fill in with grass seedlings and the Musk Thistle is on the decline. These areas of Musk Thistle were previously treated mechanically and chemically.

Fig. 8 - (Unit 11, photo pt. 22) Although much bare ground, a product of overrest, has been reduced or eliminated with time grazing and herd impact, this photo point shows that we are not there yet. 5/91 CK

G-15 & Stowell

This cell utilized both refuge and private land. Cattle began grazing on private land on May 4. They moved through seven paddocks (22.5 acres each) on seven day moves, and they entered the refuge on June 14. The 80 acres of refuge grassland was grazed in 4 paddocks totaling 20 acres each, in 3 day moves. The cattle then moved back onto private land to work through the first seven paddocks, again on seven day moves. All cattle were removed on August 6.

All water for this cell is on private land. A rural water system had been used in the past, but a misunderstanding occurred in 1991 concerning the addition of the Refuge acres to this system, so it may be necessary to utilize an existing well in the future. The rural water had been used mostly for convenience, and water supplies should not be a limiting factor for future grazing.

Refuge paddocks received only one 3-day treatment each, and responded well. Native grasses showed good regrowth and seed production, while bromegrass appeared to go dormant following the graze. Heavy brome infestations in the grassy draws appear to be getting narrower as the grazing treatments continue.

G-19

This 118 acre cell has 9 paddocks and was grazed for the first time in 1991. Twenty cow/calf pairs moved through the paddocks on 4 day moves beginning April 27. The first four paddocks were grazed a second time on 5 days moves beginning June 3. This allowed 34 days of rest between treatments. All cattle were removed on June 21.

This Unit has been reseeded to native grass in the past and has pretty good grass composition, but suffers from brome invasion in most areas. Grazing treatments should target smooth bromegrass in the future.

G-21

This 110 acre, 11 paddock cell was grazed with 45 cow/calf pairs beginning April 26. Cattle were on 2-5 day moves and had moved through all paddocks by June 1. It had been planned to move through the paddocks a second time on 2 day moves, but the cooperator mistakenly turned his cattle into seven paddocks at once. To prevent a further breakdown of the treatment in this Unit, he was asked to terminate grazing and remove all cattle from the Unit.

Most of this Unit consists of reseeded natives. Smooth bromegrass has invaded heavily into some of the east paddocks.

Future grazing treatments should be aimed at reducing bromegrass, primarily in P1 & P2. One portion of the cell, the flat hill top of paddocks 7 through 9, has a sparse warm season grass community. Future grazing treatments should continue to impact the bare soil and capping.

G-22

Unit 22 consists of 55 acres and was grazed for the first time in 1991. It was divided into 3 paddocks, and was grazed from August 1-13 with 31 cow/calf pairs in moves of 5 days, 4 days, and 4 days.

This unit lies on the east side of Bow Creek towards the southern end of the refuge, and contains areas of extremely sandy and fragile soils. Much bare ground, and a dominance of old and dying plants, with a fair amount of prickly pear cactus is found in the lower flat, while a higher bench is dominated by cool season western wheatgrass. Cattle did a good job of moving throughout the paddocks and disturbing the soil, but there were significant areas where no impact occurred. Paddocks should be divided, or cattle numbers increased in 1992.

G-23

This 144 acre, 6 paddock cell was grazed one time with 40 cow/calf pairs beginning May 5. Cattle were in the first paddock 10 days, the second paddock 7 days, and 5 days in each remaining paddocks respectively. All cattle were removed on June 13.

This was the third year of grazing treatment for this unit. A variety of grassland communities exist in this unit. Native hills, brome draws and grassy flats, abandoned farmland, and reseeded natives. The reseeded portion was just reseeded in the spring of 1990, and was excluded from the grazing treatment. The native hills and go-back area have a high incidence of old and dying plants, but hoof impact seems to be gradually reducing these. Smooth bromegrass should be targeted in future treatments by hitting it twice in fairly close succession before the plants have a chance to rebuild their root reserves.

G-24 & 25

These two cells were grazed as one cell by the permittee. G-25 totals 20.8 acres and 9 paddocks. Grazing with 31 cow/calf pairs began on May 7. Cattle were moved through all paddocks on 3-6 day moves twice. Forty-three days of rest was allowed between treatments. Grazing in this cell ended on July 20.

The plant diversity in this cell is as good as most areas. The plants seem to respond well to grazing treatment with increased

vigor and seed production. Some bare ground remains, and cattle did not satisfactorily impact some areas of heavy mulch during the 1991 treatment. Grazing treatment should continue in this unit to maintain the grassland improvements noticed so far.

G-24 consists of three small triangles of 10, 12, and 8 acres respectively, and a fourth 20 acre paddock across the road from paddock A. PD & PA were grazed June 16-23 on 3 and 4 day moves, and then each of the four paddocks was grazed during the period July 21-31 with 2-4 day moves.

Even with a lack of post season rains, response was favorable. Areas of annual weeds and bare ground are still evident, but continue to decline. A brome invasion exists in paddocks A & B, and should be targeted in future treatments.

8. Haying

Two tracts of grass were bid for haying in 1991. Tract I yield was 25 tons at $20.25/T with a payment of $506.25. Tract BR (located on Bureau of Reclamation operational areas) yield was 39.5 tons at $26.30/T with a payment of $1,038.85. The hayed areas are odd corners that are primarily smooth brome.

9. Fire Management

Temporary Knowles passed the annual step test, while Schoonover and Karges ran 1 1/2 miles to qualify to participate in prescribed burning operations.

Several prescribed burns were planned, however, no burning was conducted during 1991 due to the extended drought conditions and very low soil moisture levels.

10. Pest Control

Musk thistle continues to be a problem in some areas of the refuge. The Stockton inmate crew spent many hours hand digging plants during the spring and summer. Musk thistle head weevils (Rhinocyllus conicus) are well established and are beginning to stress the thistle, however, mechanical controls are still needed in many areas.

Limited prairie dog control was conducted on the perimeter of the 15 acre town to keep the town from spreading to neighboring private fields and CRP ground.

Two hundred pounds of Nolo bait (a natural spore for control of grasshoppers) was applied to permittees fields in 1991. The Nolo bait has proven to be very effective on grasshoppers if applied at the correct time.

12. Wilderness and Special Areas

In 1969, a 120 acre tract was established as the Solomon River Grassland Natural Area. This area has been incorporated into the grazing management program. Grazing will prevent a decline in habitat conditions resulting from overrest and invading cool season grasses.

G. WILDLIFE

2. Endangered and/or Threatened Species

Bald eagle numbers for the 1990-91 migration peaked at 11 in January. A peak of 6 was recorded during December of the 1991-92 migration. Eagle use at Kirwin NWR is directly tied to migrating Canada goose populations.

Whooping cranes are uncommon visitors to the area. No sightings were confirmed in Phillips County during the year.

3. Waterfowl

Kirwin's primary function is to serve as a migratory feeding and resting area for waterfowl. In the 1950's and 1960's, when the reservoir was filling, the area was utilized extensively by white-fronted geese. However, in recent years Kirwin has become a major migration and wintering area for Canada geese, while white-fronted goose usage has declined. Snow geese are also present but in insignificant numbers. Ducks are also represented, by a variety of species, usually with a high percentage of mallards.

Fig. 9 - Canada geese bask around the limited open water of Kirwin Reservoir in late December. 12/91 BTS

Early winter/spring peaks were recorded in January with 30,000 Canada geese, 1,000 white-fronted geese and 200 snow geese.

In the fall, a Halloween snow storm dumped up to 14 inches of snow in the area, resulting in a large influx of geese. The population rose from 1,285 on October 29 to 25,100 on November 5. A peak of 34,000 Canada geese (ten year average 37,000) was recorded on November 12. The white-fronted goose population peaked at 1,100 (ten year average 3,300) on November 5. Snow geese also peaked on November 5 at 500 (ten year average 1,100).

A peak of 20,400 (ten year average 27,709) ducks was recorded in early November, composed primarily of mallards (49%), scaup (10%) and American widgeon (7%), however, all species common to the central flyway were censused.

Kirwin NWR is primarily a migration and/or wintering refuge, with limited production of Canada geese, blue-winged teal, mallards and wood ducks.

4. Marsh and Waterbirds

Marsh and waterbird use at Kirwin NWR is primarily white pelicans and double crested cormorants. Peaks of 1800 pelicans and 500 cormorants were recorded. Other marsh and waterbirds present included great-blue herons, eared grebe, pied-billed grebe, cattle egret, snowy egret, and sandhill cranes.

Fig. 10 - Cattle egrets are a fairly common sight on Kirwin Refuge. 7/91 BTS

Great-blue herons and double crested cormorants have nested on Kirwin NWR in the past, although no nesting was reported in 1991.

5. Shorebirds, Gulls, Terns and Allied Species

Category birds reported during 1991 included killdeer, Baird's and least sandpiper, American avocet, lesser yellowlegs, common tern, ring-billed gull and Franklin's gull.

6. Raptors

Red-tailed hawk, northern harrier and turkey vulture are common during warmer months. Great-horned owls are present year round. Winter species include bald eagle, golden eagle and rough-legged hawk. Other raptors censused include kestrel, Swainson's hawk and prairie falcon.

7. Other Migratory Birds

Other significant migratory bird numbers observed were 600 crows and 400 black-billed magpies recorded in October.

8. Game Mammals

White-tailed deer are common throughout the refuge. No aerial survey was completed, but estimates place the herd at approximately 400 animals. The extremely dry conditions during the summer had a significant impact on habitat, but did not seem to affect deer health.

Fig. 11 - Extreme drought conditions seemed to have no adverse impact on a thriving whitetail deer herd. 12/91 DB

Mule deer are also present in the area, although sightings on the refuge are uncommon. No more than a dozen animals are present on the refuge at a given time.

Other resident game mammals at Kirwin include cottontail rabbit, jackrabbit and fox squirrel.

10. Other Resident Wildlife

In 1991, ringneck pheasant numbers were slightly higher than 1990, but still below normal pheasant populations observed in the past.

Fig. 12 - Bob-white quail seem to be on the increase, although they are observed only occasionally. 12/91 DB

The Rio Grande turkey population continues to thrive with an estimated population of 300 to 400 birds. A flock of 225 was seen on the refuge in early winter.

A sixty acre black-tailed prairie dog colony makes its' home on the refuge. The colony continues to spread and contains approximately 1,500 animals. Population control measures may have to be implemented to keep the colony from spreading to adjacent private land.

Predatory mammals present on Kirwin NWR include coyote, raccoon, skunk, weasel, badger, mink and bobcat. There have also been a number of unconfirmed sightings of mountain lions in the area. In August, the local conservation officer was called to a farm 4 miles southeast of Kirwin to check on a reported sighting. Five one week old kittens were found in a barn, but it was not determined whether they were bobcats or mountain lions.

11. Fisheries Resources

Fisheries management on Kirwin reservoir is the responsibility of the Kansas Department of Wildlife and Parks. Wide water fluctuation has eliminated natural reproduction of several species and greatly reduced survival of fry into their second season. This problem is likely to continue until water levels can be stabilized.

Cedar tree fish structures were placed in the reservoir by the Department in March to provide spawning areas and protection habitat for young fish.

A total of 400,000 wiper fry were released into the reservoir in 1991 by the State.

H. PUBLIC USE

1. General

Visitation numbers were up a little this year, from 57,800 in 1990 to 78,000 in 1991. The lake was at an all time low at under 900 water surface acres. Visitation to the refuge was mainly for hunting and general wildlife observation.

The Boy Scouts of America maintained Special Use Permit KIR-220, for the use of 28 acres of the refuge as a waterfront for Camp Hansen.

Refuge Assistant Stockman and SCA Volunteer Chris King manned a booth at the Kansas State Fair in Hutchinson for two days in September.

Fig. 13 - SCA Volunteer Chris King helped Carl Marx (Quivira NWR) man the FWS booth at the Kansas State Fair. 9/91 DS

2. Outdoor Classrooms - Students

In March, a refuge tour was given to a third grade class from Kensington. Students were taken on a bus tour along the North Shore Tour Route.

In May, Karges conducted a tour of the refuge for 25 Eastern Heights (Kirwin/Agra) 3rd and 4th graders.

4. Interpretive Foot Trails

The Woodland Nature Trail consists of a half-mile loop through a shelterbelt. The revised interpretive trail system, installed in 1987, continues to receive positive comments from individuals and refuge guided tour groups.

Fig. 14 - The Woodland Nature Trail provides a quality experience for young and old. 9/91 DK

The Stockton inmate crew kept the trail cleaned of all fallen trees and branches. A local tree service was hired to open several clearings in the shelterbelt. The clearings will be planted to fruiting bushes and replacements for the older dying elm trees.

5. Interpretive Tour Routes

Eleven interpretive displays were erected along the North Shore Tour Route in 1990 to serve as a self-guided auto tour route. The displays describe various aspects of the refuge such as grazing and farming for wildlife, succession and a historical description of the area. The route receives fairly heavy use by the public.

7. Other Interpretive Programs

Suthers presented the "Integrated Pest Management" section for the Phillips County Alfalfa Production School in January.

Karges gave a slide presentation on wildlife identification to 75 grade school students in Phillipsburg in March.

SCA Volunteer Chris King taught a 3-day course on firearms safety and familiarization to 24 girl scouts at the Hansen Scout Camp, located adjacent to the refuge.

A 4-H Nature Day Camp was held on the refuge in July. King presented a program on the benefits of Kirwin NWR to 115 4-H members and 45 counselors and instructors.

Schoonover spoke about job opportunities with the Service during Career Days at Phillipsburg High School in October.

8. Hunting

Legal species on Kirwin include waterfowl, doves, pheasant, quail, turkey, prairie chicken, snipe, coot, cottontail rabbit, fox squirrel and deer (archery only).

A controlled goose hunt was held for the second year in a 700 acre area of dry lake bottom that is currently being farmed. This area is otherwise closed to the public. Over 400 applications were received for the hunt, which was held from 1/2 hour before sunrise to noon on Wednesdays and Sundays. Successful applicants were selected via a random computer drawing. The hunters were required to walk in and out of the area (up to 2 miles) and there was a limit of three shells per hunter. Despite the restrictions, the vast majority of comments were favorable.

Fig. 15 - Six portable blinds were used to provide a quality goose hunt for successful applicants in a portion of the refuge normally closed to hunting. 11/91 BTS

In 1990, a restriction of three shells per Canada goose allowed in the bag was implemented on the public hunting area that receives the most goose hunting pressure. This restriction was implemented because of unacceptably high crippling rates from "sky busters". The majority of comments are favorable and are received from "good" hunters who can now take the time to decoy birds and take quality shots.

Also in 1990, all shotgun hunting on the refuge was converted to steel shot only. There has been little opposition to this change, although there are still lead shot cases being made.

While firearms deer hunting is not allowed on the refuge, Kirwin NWR does provide for some excellent archery hunting. Hunting pressure continues to grow as hunters from all over the state come to Kirwin in search of a trophy whitetail. This increased pressure also brought increased problems including stolen tree stands, permanent tree stands, hunter harassment in crowded areas, etc. Despite the problems several nice bucks were harvested.

Fig. 16 - Kirwin continues its' reputation as a producer of healthy large bodied, large antlered deer. 12/91 BTS

Spring turkey hunting pressure has also increased, but not to the point of causing problems. Fall turkey hunting in this unit of the state is restricted to archery only, thus pressure has been very light.

Early season pheasant hunting was made extremely difficult by a pre-season snow storm, and hunter success was less than one bird per hunter.

9. Fishing

The Kirwin reservoir fisheries is managed by Kansas Department of Wildlife and Parks. Major harvest species were channel catfish, crappie, walleye and drum. Due to low lake levels, fishing pressure was light.

11. Wildlife Observation

A significant portion of Kirwin's public use consists of wildlife observation. Most visitors are local residents who realize the opportunity and make repeat visits throughout the year. The fall waterfowl migration draws people from quite a distance to observe the concentrations of Canada geese. Bald eagle are a common winter sight and also offer good observation opportunity.

12. Other Wildlife Oriented Recreation

Wildlife photography opportunities at on the refuge are excellent. Several local and some non-resident photographers take advantage of Kirwin's abundant wildlife diversity.

13. Camping

Camping is one of Kirwin's most popular recreational activities. Camping peaks with the fishing season from April-June. Holiday weekends also bring out large crowds of campers.

15. Off-Road Vehicling

Vehicle trespass continues to be a problem. Kirwin has many county roads that provide access to the refuge. There are also many trails that were established when the lake was full to provide fishing access. These trails no longer serve that function, but the local custom of drive rather walk still prevails. As new trails are formed, or old ones are reopened, signs are posted. Several violations are issued each year for off-road travel.

16. Other Non-Wildlife Oriented Recreation

Boating, water-skiing, swimming, and horseback riding occur in limited amounts on Kirwin NWR. Recreational drinking is also a popular pastime.

17. Law Enforcement

We are very fortunate to have an excellent working relationship with Kansas Department of Wildlife & Parks personnel, including their Law Enforcement Division. A State Conservation Officer is stationed locally in the city of Kirwin, and because Kirwin Refuge is the hub of many recreational and hunting activities in Phillips County, he spends much of his time working on and around the refuge, primarily targeting recreational activities associated with Kirwin Reservoir.

In 1991, due to personnel transfers, Kirwin Refuge had only one officer with law enforcement authority much of the year. This

resulted in some long and hectic hours, working both undercover and maintaining a high public visibility. The results were positive, as many private citizens feel comfortable in getting involved, often reporting suspected violations and violators. One of several such cases involved a deer shot legally off the refuge during rifle season that made its way onto the refuge before dying. The hunter was given permission to enter the refuge to look for the deer, but claimed not to have found it. A tip several days later revealed the hunter had found the deer, removed its head, and kept on hunting. This tip resulted in the successful apprehension of the violator in a case that might have gone undetected otherwise.

Fig. 17 - Slob hunters appear to be everywhere, even on Kirwin Refuge. The good news is, we "got" him. 11/91 BTS

In 1991, a total of 43 citations were issued by both State and Federal officers on Kirwin Refuge. These cases included fishing, boating, and hunting violations, as well as miscellaneous law infractions involving public use around the reservoir.

I. EQUIPMENT AND FACILITIES

1. New Construction

An agreement was reached with the city of Kirwin to use up to 50,000 gallons of city water for grazing in units close to town. Consequently, 5 miles of water line was installed by a

contractor to three grazing units that did not have a reliable water source.

Fig. 18 - Underground electrical line was run into two grazing units to provide a more reliable power source for electric fence chargers and water pumps. 12/91 BTS

2. Rehabilitation

A tornado passed through the southern part of the refuge in April, destroying approximately one mile of boundary fence and one portable stock water tank. There was also significant tree damage where the tornado went through. The fence, previously scheduled for replacement, was replaced by the Stockton inmate crew.

In addition to the tornado damaged fence, the inmate crew also replaced 5 miles of boundary fence and repaired an additional 5 miles. One and one half miles of new fence was also erected along a county road that passes through the refuge to keep cattle off the roadway.

A local locksmith was hired to rekey all existing door locks to one key. Previously, 8 keys were required to open all personal and overhead doors on the refuge.

The staff and inmate crew spent a significant amount of time maintaining and cleaning the camping and picnicking areas, especially before and after holiday weekends.

3. Major Maintenance

The roof on the shop building was replaced by a local contractor, following removal of the old roofing by the inmate crew.

Major maintenance of the refuge quarters included replumbing, repainting of the interior, installation of a new hot water heater, floor tile installation in the utility room, and installation of a water softener and reverse-osmosis water filtration system. The water system was installed because of unsafe levels of nitrate in the water supply.

The interior of the refuge office was repainted and wood trim replaced around windows and doors. The old coat closet was converted into an alcove for the filing cabinets. It freed up much needed floor space in the refuge assistant's office.

4. Equipment Utilization and Replacement

New vehicles received during the year included a Chevy S-10 4x4 pickup and a Chevy one ton 4x4. A topper was also purchased for the S-10. The one ton, purchased as a fire truck, was outfitted with a Warn winch and a new fire pumper was received to give us two complete fire units.

Fig. 19 - The 1991 S-10 pickup received $1,350 damage when backed into while legally parked in Phillipsburg. It seems like it is always the "new" ones. 12/91 BTS

Two 1,000 gallon above ground fuel tanks were delivered by Sannipoli Tanks of California, to replace five underground tanks. The undergrounds will be removed in 1992. Also, a 1,000 gallon underground propane tank was replaced with an above ground 1,000 gallon tank.

Fig. 20 - Two 1,000 gallon above ground fuel tanks were installed to replace five existing 500 gallon underground tanks. 12/91 BTS

Other new equipment received during the year included two Stihl chain saws, a Weed Badger for shelterbelt cleaning, a Honda four wheeler, a Wegele riding mower, a new chest freezer and a Hotsy pressure washer.

5. Communications Systems

A second telephone line was installed to accommodate the fax machine and computer modem for electronic mail.

7. Energy Conservation

The following table compares current energy consumption with the base year of 1990:

Table 5 - Energy Conservation - Kirwin NWR

	Gas	Diesel	Electricity	Propane	Mileage
Base Year (1990)	1,769	2,956	12,712	2,245	38,552
1991 Use	1,078	2,022	15,318	2,495	27,199
Increase/Decrease	-691	-934	+2,606	+250	-10,353
% Increase/Decrease	-39	-32	+21	+11	-29

J. OTHER ITEMS

1. Cooperative Programs

Kirwin has four cooperative agreements that affect the refuge.

These agreements are:

A Cooperative agreement between the Bureau of Reclamation and the Fish and Wildlife Service was approved on June 17, 1954. This is the basic agreement which allows the refuge, as an overlay on the reservoir, the management of habitat and wildlife resources.

A Cooperative agreement between the Bureau of Reclamation and the Fish and Wildlife Service was approved on October 18, 1985. This is actually a revision of the original 1954 agreement, and gives the Service sole administrative jurisdiction of refuge lands and water, whereas the previous agreement required Bureau concurrence.

A Cooperative agreement between the Fish and Wildlife Service and the Kansas Department of Wildlife and Parks, giving the State the responsibility for the management of fisheries resources on Kirwin National Wildlife Refuge, was approved on June 28, 1954. This agreement stipulates that U.S. Fish and Wildlife Service will manage the land for wildlife benefits and areas will be opened for hunting and fishing when conditions permit.

A Cooperative agreement exists between the U.S. Fish and Wildlife Service and Kansas Department of Wildlife and Parks to improve upland habitat. This agreement requires the Service to maintain food plots totalling approximately 40 acres in the

grasslands open to hunting. In return Wildlife and Parks will establish and maintain woody habitat plantings for wildife utilization in these same areas.

2. Other Economic Uses

A Special Use Permit was issued to bee keeper Jerome Bydalek. He maintains a total of 112 bee hives at 3 different locations on the refuge. The cost for the permit is $1.00 per hive yearly.

3. Items of Interest

Assistant Secretary Mike Hayden visited Kirwin Refuge on December 23, 1991, while in the area to discuss refuge issues and see if there was anything he could do for us. Apparently Mr. Hayden moved to Washington, but left his heart in Kansas.

The refuge was the recipient of a $1000 Memorial Fund that is to be used in memory of Lyle Davis Jr. to enhance the goose program.

Manager Suthers attended the HRM course at the Center for Holistic Resource Management in Billings, Montana on February 5-6.

ROS Chad Karges attended an LE Refresher course at Marana, AZ on February 19-28.

ROS Karges attended a Coordination Meeting with the Kansas Department of Wildlife & Parks, the Kansas Chapter of Wildlife Society, and the Kansas Academy of Sciences in Lindsborg, Kansas on April 10-12.

ROS Karges attended a Non-game Workshop in Golden, CO on April 29 through May 3.

ROS Karges & Clerk Diane Stockman attended the Administrative Meeting held at the Sheraton Hotel in Denver, CO on May 19-24.

Manager Bruce T. Schoonover & ROS Chad Karges attended a Firearms requalification held at Quivira NWR on July 15-16.

Manager Schoonover attended a Project Leaders meeting at LaCreek NWR on August 12-16.

Refuge Assistant Stockman and Volunteer Chris King attended and helped man the Refuges booth at the Kansas State Fair in Hutchinson, Kansas on September 11-13.

Manager Schoonover presented a program to the Phillipsburg Kiwanis Club on October 8.

Manager Schoonover attended 504 Training which was held at Quivira NWR on November 21-22.

Manager Schoonover and Refuge Assistant Stockman attended a DOS Computer class in Smith Center, KS on November 18.

Manager Schoonover and Refuge Assistant Stockman each completed a Thomas R. Hardy correspondence course and received their warrant authority for $2,500.00.

4. Credits

Schoonover: Sections D, F, H.5, H.8. H.17
Johnson: Sections G, H & I
Stockman: Sections E, J & type and assemble narrative

K. FEEDBACK

Nothing to report.